Not applicable

Reference to Microfiche Appendix

Not applicable"

Amend the first paragraph on page 2 to read as follows:

A1

The field of communications has benefited enormously from the introduction of optical communications technology. Fundamentally, this technology exploits the inherent bandwidth potential of the light itself as a carrier. As this technology matures, the need for the direct optical processing of signals is becoming greater. Much of the communications infrastructure in operation in the field relies on optical signals being converted back to electrical form for certain processing and management functions. Direct optical processing has the benefit of avoiding the need for such conversion with its associated costs, losses and amplification requirements.

Amend the last paragraph on page 2 to read as follows:

A2

A variety of specific structures for optical crossbar switches have been proposed. While many of these rely on non-linear optic materials to obtain switching actions, a very popular way to achieve this end at the time of this application for letters patent is by means of micro-electromechanical structures. These are usually micro-mirror devices that tilt, flex, or flip upon application of an appropriate control voltage.

Amend the third paragraph on page 3 to read as follows:

A3

At the device level, this creates a desire for the reflective elements to have the highest possible natural resonant frequency. While materials choice for the reflective element

Cancel A3

can help to make this frequency as high as possible, the very size of the mirror structure is a core issue. The reflective element needs to be as small as possible.

Amend the fourth paragraph on page 3 to read as follows:

A4

This requirement presents a problem in that the small apertures involved in the cores of the optical fibers carrying light signals lead to considerable beam divergence, which is typically addressed via micro-lenses to collimate the emerging beam. However, this collimation is also inherently limited by the aforementioned aperture dimensions with the result that it is very difficult to maintain very narrow beam widths across the lateral extent of a multi-channel crossbar switch. The mirrors therefore have to be larger than the beam width in order to reflect most of the incident beam. This requirement for larger mirrors is contrary to the need for high speed switching.

Delete the first two paragraphs on page 4.

Amend the first paragraph on page 6 to read as follows:

A5

In the illustrated embodiment, the micro-machined mirrors are flipped into and out of reflecting positions. It will be clear to those skilled in the art that there is a variety of mechanisms by which these mirrors might be moved to serve the same function, including various forms of rotation and translation. Flipping them up or down has been selected for the preferred embodiment of the present invention because this method is both simple and proven. Optical cross-connects (or crossbar switches) using micromachined mirrors are well-known in the art and need not be detailed here any further. They are commercially available from companies such as Lucent Technologies of Murray Hill, New Jersey.